

*Anna Dore  
Recs. from  
S. Town  
Wed., 8/27/97*

## **RECOMMENDATIONS:**

**A combined Environmental Impact Study for SeaTac Airport and King County International Airport encompassing the Georgetown residential neighborhood and other neighborhoods north of SeaTac Airport to date not included. Include all aircraft emissions in Puget Sound Air Pollution Control Agency maintenance and inventory plan/State Implementation Plan.**

**Enforce laws providing that an airport shall not damage the health of people nor damage property in adjacent residential areas.**

**Enforce State Law stipulating that aircraft testing and maintenance shall be performed at remote sites whenever possible.**

**Protect residential zoning by enforcing industrial buffers.**

**Prohibit environmentally damaging activities near residential areas and the playfield.**

**Require National Air Guard or other polluter to clean up arsenic, PCBs, etc., in or near "Burial Site" soil across from houses on Ellis Ave. S. Same pollutants have been found in Duwamish River fish.**

**Test the drinking water for volatile organic compounds at open water reservoir sites. Benzene, etc., has been documented in Department of Ecology air samples taken near reservoirs. Shield water from contaminants.**

**Curtail ground water and water runoff contamination at KCIA.**

**Monitor for volatile organic compounds, particulate matter and polycyclic aromatic hydrocarbons in Georgetown and other neighborhoods with high health risk.**



PUGET SOUND AIR  
POLLUTION CONTROL AGENCY

DAVID S. KIRCHER  
MANAGER ▲ ENGINEERING  
(206) 689-4050  
1-800-552-3565

**Redesignation Request and  
for the  
Seattle, Kent, and Tacoma  
PM<sub>10</sub> Nonattainment**

*pages 626-2057*  
110 Union Street, Suite 500, Seattle, Washington 98101-2038

*Here's the material  
you requested!*

prepared for:

Puget Sound Air Pollution (

In response to your request, we hope  
the enclosed material will serve your  
purpose. If we may be of further  
service, please don't hesitate to let us  
know. *Official comment period  
is Sept. 9 - Oct. 9, 1997.*

From:

Dave Kircher

July 31, 1997

prepared by:

Sierra Research, Inc.  
1801 J Street  
Sacramento, CA 95814  
(916) 444-6666

KCSlip4 34704

SEA401251

Ultimately, these emission factors were applied to the latest available tabulation of households in each NAA to compute emissions from residential wood burning. The tabulations for both 1994 and 2010 assumed the same residential wood use patterns documented in 1993 would still apply. The total numbers of households were increased based on information from the cities to represent 2010.

### **Ships**

Portions of the Ports of Seattle and Tacoma are included in the Duwamish and Tideflats nonattainment areas, respectively. Emissions associated with ships hoteling at piers and terminals in each port were tabulated based on the Ports' monthly data on ships docking in 1994, an estimate of the hourly, per vessel fuel consumption (Ports of Seattle and Tacoma, 1995), and an emission factor published by EPA (Booze-Allen, 1991).

### **Trains**

Direct emissions from line haul and switch engine locomotives in each NAA were tabulated based on estimates of the fuel use and EPA emission factors (Booze-Allen, 1991). Fuel consumption for each NAA was calculated based on consultation with the railroads in the region (i.e., Burlington Northern/Santa Fe, Union Pacific, Beltline, and AmTrak).

### **Allowable Industrial Emissions**

Emissions from industrial sources in the Seattle and Tacoma NAAs were tabulated based on the PM10 emissions allowed by their respective permits. The emissions included in this tabulation have changed since the last tabulation in the PM10 SIP due to permitted equipment changes and the inclusion of additional equipment that was not previously considered. Expected allowable emissions increase slightly in 2010 compared with 1994. The allowable emissions for all industrial sources considered in this study are included in Attachment 6.

### **Aircraft Emissions**

Aircraft emissions were not specifically considered in this emissions inventory because the EDMS model did not include PM10 emission factors for the predominant types of aircraft being used in the Seattle NAA. Aircraft emissions would be included as part of the PM10 background.

Table 7  
**PM<sub>10</sub> Emission Inventories**  
 (kg/day)

Source Category	Seattle		Tacoma		Kent	
	1994	2010	1994	2010	1994	2010
Ships	15	26	26	35	n/a	n/a
Locomotives	20	34	13	22	1	2
Road Dust	55	63	37	42	30	21
Woodburning	65	73	90	101	77	97
Gasoline Exhaust	105	84	50	48	30	17
Diesel Exhaust	223	64	122	46	45	10
Allowable Industrial	2,374	2,427	4,035	4,238	n/a	n/a
<b>Total</b>	<b>2,857</b>	<b>2,771</b>	<b>4,372</b>	<b>4,532</b>	<b>183</b>	<b>147</b>

Emissions from other sources within the nonattainment areas (e.g., industrial fugitives, space heating) and from all sources outside the nonattainment areas are treated as a background concentration in the maintenance demonstration. This background concentration was estimated based upon a comparison of measured and modeled results for the James Street and Central Avenue monitoring site in Kent (see Appendix C, Attachment 2).

The WYNDvalley (Version 3.05) dispersion model was used to model the five days during the winter of 1993-'94 with concentrations greater than 70  $\mu\text{g}/\text{m}^3$ . On average, the modeled concentrations were 47  $\mu\text{g}/\text{m}^3$  lower than the measured values. Filter samples collected on these days were analyzed with the EPA's Chemical Mass Balance (CMB7) receptor model to determine the source apportionment.

Table 8 shows the receptor modeling results. These results are in agreement with the source apportionment percentages derived from dispersion modeling, implying that the source apportionment of the background sources is similar to the modeled inventory for Kent. Therefore, given a background concentration of 47  $\mu\text{g}/\text{m}^3$ , woodsmoke should account for about 17  $\mu\text{g}/\text{m}^3$ , exhaust from fossil fuel combustion about 19  $\mu\text{g}/\text{m}^3$ , dust sources about 8  $\mu\text{g}/\text{m}^3$ , and secondary sulfates and aged marine sources the remainder.

The background concentration for Kent was used in the maintenance demonstrations for Seattle and Tacoma as well. This concentration was chosen for the following reasons.

- Kent is geographically situated midway between the Seattle and Tacoma areas.
- It is consistent with the concentrations used in the attainment plans, where the background from "non-woodsmoke" sources was assumed to be 15-20  $\mu\text{g}/\text{m}^3$  and

woodsmoke sources (both residential and industrial) ranged from 18-77  $\mu\text{g}/\text{m}^3$ .

- Maintenance is demonstrated with any background concentration between zero and the design values.

The background concentrations were assumed to remain unchanged through 2010 for the following reasons.

- Continued motor vehicle fleet turnover will offset future growth in regional traffic volumes. Exhaust emission factors are projected to decline by nearly 60% while regional traffic volumes are expected to increase by only 22%.
- Continued woodstove turnover will result in fewer uncertified stoves and a higher fraction of natural gas fired stoves and fireplaces will offset population growth.
- Continued implementation and enforcement of woodsmoke curtailments (burn-bans) when  $\text{PM}_{10}$  concentrations exceed half the standard will help prevent high woodsmoke concentrations.
- Continued implementation and enforcement of fugitive dust regulations will prevent high dust concentrations.
- Continued implementation and enforcement of outdoor burning regulations and expansion of the geographic areas where outdoor burning of land clearing debris and yard waste is prohibited will help prevent high woodsmoke concentrations.
- Maintenance is demonstrated in all three areas with a 2010 background value as high as 82  $\mu\text{g}/\text{m}^3$  (i.e., a 35  $\mu\text{g}/\text{m}^3$  increase).

Table 8 Source Apportionment for Kent	
Source Category	Contribution (%)
Vehicle exhaust	40.4
Residential wood combustion	37.3
Fugitive dust	16.4
Secondary sulfate	5.2
Aged marine	0.6

**Table S1. Seattle Duwamish NAA PM10 Emissions Summary: 1994 and 2010**

Source Category	1994		2010		% Difference 1994 to 2010
	Emissions (kg/day)	Percent of Total	Emissions (kg/day)	Percent of Total	
Motor Vehicle-Related Sources					
Exhaust	328	11%	148	5%	-55%
Resuspended Road Dust	55	2%	63	2%	15%
Total	383	13%	211	8%	-45%
Residential Wood Combustion	65	2%	73	3%	12%
Ship Generator Exhaust	15	0.5%	26	1%	73%
Locomotive Exhaust					
Switch Engine	17		28		65%
Line-Haul Train	3		6		100%
Total	20	0.7%	34	1%	70%
Allowable Industrial	2374	83%	2427	88%	2%
Total PM10 Emissions All Sources	2857		2771		-3.0%

**Additional Information Regarding Table S1**

**Related Figure(s): S1, S2 & S3**

From the Desk of

Cynthia Stewart

(206) 296-4388

8/28/97

Frank -

This is the info. from last night's Georgetown Planning Committee meeting. The top page are the recommendations, to which we'll need to respond officially, as soon as possible. The other pages are Lorna's handouts which accompanied what was apparently a very long presentation - but I have no record of what she said.

Let's talk tomorrow or Tues.

Thanks - Cynthia

Pls. FAX  
to Frank  
Re: Figs,

Bureau

& return  
originals to  
me.

Thx -  
cp

✓

KING COUNTY INTL

..... (AUTO) .....

THE FOLLOWING FILE(S) ERASED

FILE	FILE TYPE	OPTION
084	TRANSMISSION	

TEL NO.  
9-6552133

PAGE	RESULT
08	OK

.....  
ERRORS

1) HANG UP OR LINE FAIL      2) BUSY      3) NO ANSWER      4) NO FACSIMILE CONNECTION